

## Research Article

## Enhanced relaxation in students after combined Depth Relaxation Music Therapy and silence in a natural setting

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## ABSTRACT

This study includes a design that combines Depth Relaxation Music Therapy (DRMT)/Hypnomusicotherapy (HMT), silence, and nature. Participants ( $n = 84$ ) were divided into seven groups and first received 16 min of DRMT/HMT followed by 6:30 min of silence or a 16-min seminar focusing on silence in therapy and counselling succeeded by 6:30 min of silence. In the seminar, the subjects were invited to participate in a moderated group discussion and to communicate their experiences and ideas concerning silence in health-related settings. Each group then experienced the other condition (within-subject design) with one week in between. The overall process was conducted in the natural setting of a city garden. The aim of the study was to compare the effects of a 6:30-min silence following either a group discussion on silence (university seminar) or a session of DRMT in a natural setting. Participants in the DRMT/HMT condition relatively overestimated the duration of silence and felt that time had passed more slowly as compared to silence following the seminar. Relaxation was significantly increased both after silence following DRMT/HMT and silence following the seminar, a probable effect of exposure to nature. Within the DRMT/HMT-study arm, participants who were more relaxed also felt themselves more intensely, experienced space to a lesser extent, and felt that time had passed more quickly. In conclusion, both silent conditions in nature fostered relaxation. These study conditions combining silence, nature, and DRMT/HMT proved to be effective as a group music therapy method and should be further explored.

## Introduction and background

At first glance, the title of this article introduces an unconventional juxtaposition of theory, practice, and research in music therapy by combining the terms nature, silence, and Depth Relaxation Music Therapy (DRMT)/Hypnomusicotherapy (HMT). In recognition of current developments, investigations, and publications in the therapy community, the above-mentioned combination is no longer uncommon. Ulrich (1979, p. 22, 1984 was among those who studied the possible benefits of human exposure to nature on psychological well-being and recovery from surgery. He concluded that outdoor visual environments can influence individuals' psychological well-being. It makes a significant difference in postoperative recovery if a patient looks at a tree instead of a brick wall outside the window of his hospital room. Those patients with tree views "[...] had shorter postoperative hospital stays, had fewer negative evaluative comments from nurses, took fewer moderate and strong analgesic doses, and had slightly lower scores for minor postsurgical complications" (Ulrich, 1984, p. 421). Lederbogen et al. (2011, p. 498) and Lederbogen and Meyer-Lindenberg (2016, pp. 65,

68) insist that city living, as compared to urban upbringing, results in a higher vulnerability to social stress processing. Mental diseases, such as depression, schizophrenia, and anxiety disorders, have been found to occur more frequently among populations living in urban environments.

Terms like "Nature-Deficit Disorder" (Louv, 2008) or "Nature Deficiency Syndrome" (Weber, 2008, p. 19) have recently been defined to categorize symptoms resulting from a lack of exposure to nature. In this context, research provided evidence that a simple 90-min walk in a natural setting decreases rumination and associated neural activity in the subgenual prefrontal cortex (sgPFC), whereas a 90-min walk in an urban setting does not (Bratman, Hamilton, Hahn, Daily, & Gross, 2015, p. 8567). Exposure to natural environments through photographs also shows beneficial aspects and proved to be effective in reducing impulsivity, lengthening subjective time perception, and improving human decision-making (Berry et al., 2015, pp. 10–11).

Keeping these findings in mind, it is Jordan (2015, p. 11) who recognizes "[...] a growing evidence base that points towards the role of nature and its preventative and curative effects". He believes there is

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“[a]n increasing number of therapists [...] taking their practice outdoors and walking with their clients while conducting therapy” (Jordan, 2015, p. 59). “Walk and Talk” (Doucette, 2004) as an intervention for behaviorally challenged youths is a good example. However, this is nothing new. We can trace back similar approaches to the late Hans Zulliger – a famous Swiss child and youth psychoanalyst and educationalist. He suggested going out for walks with adolescents as a therapy method, resulting in a concept known as “Spaziergang-Be-handlung” (“treatment-/therapy-walk”) (Zulliger, 1973, p. 428).

### *Music therapy and nature*

As we have seen above, there is growing evidence concerning health-promoting aspects of nature, natural surroundings, and exposure to nature. There are also theoretical and practical approaches in psychotherapy and counselling, past and present, on which research can rely. A further step now is to interlink music, music therapy, and nature.

To begin with, it seems to be useful to add a description about what “music therapy” is. The American Music Therapy Association defines music therapy as follows: “Music Therapy is an established health profession in which music is used within a therapeutic relationship to address physical, emotional, cognitive, and social needs of individuals” (The American Music Therapy Association, 2018). The German Association of Music Therapy (DMtG) adds that “[m]usic therapy is the systematic use of music within a therapeutic relationship which aims at restoring, maintaining and furthering emotional, physical and mental health” (Deutsche Musiktherapeutische Gesellschaft e. V. (DMtG), 2018). According to our study, it is crucial to understand the therapeutic relationship as an integral element in music therapeutic practice and to recognize music therapy not only as a health discipline with restorative but also pro-active and preventive, health-maintaining potentials.

Listening to naturalistic sounds or nature itself has proved to be effective in various ways, e.g. in promoting human mental well-being and relaxation (Gould van Praag et al., 2017, p. 1; Nishida & Oyama-Higa, 2014, p. 319). Fasser (2012, pp. 59–60) incorporated “nature recordings”/“natural sound pictures” into his music-therapy practice. He found a significant effect of these recordings on brain activity positively affecting relaxation reactions and emotional involvement by means of EEG spectral analysis.

A growing number of studies and publications contain approaches and ideas concerning synergetic interconnections between music therapy and nature. Aigen (1991, p. 92) writes about a personal experience in the desert, the “voice of wisdom in nature”, rituals and shamanism, and the nature of music. Further outdoor- and nature-related concepts in music therapy can be derived from the writings of Kern (2002), Kern and Aldridge (2006) and Kern and Wakeford (2007). The “Sound Path” and the “Music Hut” are outlined as therapy interventions on playgrounds for children with autism. Besides nature-related terminology, we can also find ecological approaches in descriptions of music therapy and music (Stige, 2005, p. 128; Stige & Aarø, 2011), as well as an “Ecological Music Therapy” (Kenny, 2006).

Detailed information on practice (including case examples and interventions), theory (underlying theories, framework, anthropology, etymology, and history), and research (overview of current research and ongoing projects) of nature-assisted music therapy can be found in publications by Klar (2011, 2012) and Pfeifer (2016, 2017). Pfeifer reflects on what he calls “Outdoor Music Therapy (OdMT)” as follows: “In short, OdMT may best be summarized as a generic or collective term describing a critical process of reflection and discussion concerning the application and acquisition of environmental, natural or outdoor settings and surroundings, materials and, therefore, altered therapeutic relationships in music therapy” (Pfeifer, 2017, pp. 180–181).

A brief case report, taken from Pfeifer (2017, pp. 192–193), shall be added to illustrate the link between music therapy, silence, and nature:

Ivy, 15 years old, a smart and “typical” teenager, had suffered sexual abuse in childhood and other traumatizing situations. During our regular music-therapy sessions, I [the music therapist] got the impression that the room setting suppressed Ivy’s movement and suffocated her expression. Therefore, I suggested to Ivy that we go outside. As it was autumn and the session was held in the evening, it was already quite dark outdoors. We decided to just have a walk, being careful and curiously attentive towards the sounds and acoustics surrounding us on our way. Suddenly, Ivy started to talk, hesitantly at first, and the darker it got, the more easily she shared her life. A few sessions later, she explained that the surrounding silence of nature, which was so prominent during our walk, appeared to reflect the silence and speechlessness inside herself that hindered her from verbalizing what she had experienced back then. But the securing anonymity of the cocooning darkness and the joint walking rhythm provided enough confidence and stability for her to let her thoughts go.

As Jordan (2015, pp. 40–41, 128) demonstrates, music and the arts have a lot to offer within nature-assisted psychotherapy and counselling, as well as within Nature Therapy (Berger & Lahad, 2013, p. 50). In light of a growing number of arts-therapies publications (for example, Kopytin & Rugh, 2016, 2017) providing rich material concerning nature-assisted approaches, music therapy should participate in this strong and important developmental process. One has to recognize nature as a powerful and manifold partner (e.g. as co-therapist, as material, as setting, and as a phenomenon) when interlinked with music therapy: “In any case, Outdoor Music Therapy may likely be a versatile and valuable contribution to a therapeutic community that is re-discovering nature as a major impact and integral element among a complex holistic system” (Pfeifer, 2017, p. 199).

### *Music therapy and silence*

Research in music therapy typically does not include silence as a main topic. The focus is more on the music part. This is understandable, as it is about music therapy and not about silence therapy. However, this does not mean that therapists have not thought about the silences they experience and share in music-therapy sessions (Sutton, 2005, p. 548). Citing Wakao, “[w]e should not forget that music therapy is the therapeutic method most able to treat silence in a creative way” (Wakao, 2002, p. 12). One could even claim that silence has to be viewed as an indispensable part of music – it is music! Music would not be what it is without silence. We should, therefore, acknowledge that “[s]ilence phenomenologically can appear in various forms” (Sutton & De Backer, 2009, p. 81). Sutton mentions and explains different concepts of silence in music therapy, such as silence and nothingness, silence and death, silence as absence and presence, silence as an active agent of change, and silence as hidden music (Sutton, 2005, p. 548). Lagler (2002, pp. 29–30) developed a “therapeutical circular model of silence” consisting of pre-musical silence, intra-musical silence, post-musical silence, transient silence, intra-verbal silence, and transient silence II. Although quite sparsely discussed as a main subject, we can see that literature on silence in music therapy exists.

Several authors and studies offer information concerning the effects and potentials of silence within music therapy. De Backer, for example, insists that “[s]ilence is an important aspect for structuring the play” (De Backer, 2008, p. 9). A noteworthy study design integrated silence prior to a music intervention as an important part in reducing stress in a neonatal intensive care unit (Gilad & Arnon, 2010, p. 20). Another investigation pointed out that listening to slow or meditative music can have relaxing effects. Randomly inserted pauses (silences) seemed to intensify the effects of the applied slow or meditative music in a way that relaxation was particularly evident during pauses, and the pauses seemed to reduce heart rate, blood pressure, and breathing rate (Bernardi, Porta, & Sleight, 2006, p. 446). In contrast, comparing relaxing music and silence, Kahlfa and colleagues found that silence is less effective in decreasing cortisol levels after stress induction than relaxing

music (Kahlfa, Dalla Bella, Roy, Peretz, & Lupien, 2003, p. 376). Nevertheless, regarding the above-mentioned possible and many-faceted beneficial effects silence may offer for music therapy, further research appears to be promising.

#### *Depth Relaxation Music Therapy (DRMT)/Hypnomusictherapy (HMT)*

Combinations of music therapy and nature, as well as music therapy and silence, have already been discussed. Case examples, practical approaches, theories, and study outcomes equally provide rich grounds for interesting research options. In the present investigation, music therapy, nature, and silence were all interlinked. Depth Relaxation Music Therapy (DRMT)/Hypnomusictherapy (HMT) was the experimental intervention in this study. This methodology developed by Hans-Helmut Decker-Voigt was originally applied in individual rather than group-therapy settings. The methodology referred to either as DRMT or HMT has been influenced by various approaches and techniques, such as autogenic training, guided imagery, psychoanalytic and humanistic psychology, expressive art therapy, Gestalt Therapy, and Milton Erikson's hypnotherapy. Importantly, DRMT/HMT shall not be defined as a music therapy approach or school of practice in its own right (such as Nordoff-Robbins music therapy, Psychodynamic music therapy, Developmental music therapy). DRMT/HMT is not a separate approach or model of music therapy rather than a methodology or technique within music therapy. Therefore, DRMT/HMT can be applied in various music therapeutic contexts and supports the general aims of music therapy – as to be defined by the professional associations ([World Federation of Music Therapy, 2017](#)) – and music therapeutic approaches. The procedure of HMT proceeds along seven steps or “building blocks”. Importantly, the sequence depends on the patient's physical and psycho-emotional condition and characteristics. The therapist adjusts the chronological order of these blocks according to the patient's needs. Each of the seven steps has its specific “role” (for example: “sensitization to the feeling of ‘comfort’ in the body”, “sensitization to feelings, mental images, thoughts”, “sensitization to the auditory perception of music”, etc.). Decker-Voigt suggests a time limit of between 3 and 8 min for the receptive music phase in DRMT because longer periods could create difficulties in participants' reorientation. Whereas DRMT mostly uses music (from CD or MP3 players or performed by a therapist) throughout the receptive phase, there also exist indications of the importance of silence in DRMT. According to Decker-Voigt, each DRMT session should include a little silence prior to the music in the receptive phase so that the music emerges out of silence. This helps patients concentrate ([Decker-Voigt, 2007, 2009](#)). Additional details on DRMT/HMT will be mentioned in the section “Design and analyses”.

Recent studies evaluated whether DRMT/HMT shows effects if the whole receptive phase consists solely of silence instead of using music from a CD or performed by someone. Pfeifer and colleagues found out that 6:30 min of silence following 16 min of DRMT proved to be significantly effective in fostering relaxation, lowering the sense of space and time, and reducing the future orientation in participants (students;  $n = 60$ ) ([Pfeifer, Sarikaya, & Wittmann, 2016](#)). Another study focusing on possible preventive effects of DRMT and silence on music-performance anxiety in music students ( $n = 12$ ) indicated that silence (6:30 min) following DRMT (16 min) “[...] is perceived as more relaxing and longer lasting, distracting or depressing thoughts are reduced and the auditive perception of silence changes” ([Stolterfoth, 2017, p. 1](#)). Although Decker-Voigt originally developed DRMT for application in individual therapy settings, the two investigations by Stolterfoth and Pfeifer and colleagues demonstrate the methodology's impact for group therapy.

Following the aforementioned research outcomes and possible benefits of nature-assisted approaches in therapy, the aim of our study was to compare the effects of a 6:30-min silence as a receptive phase, preceded by either a session of DRMT or a discussion on silence, as part

of a university seminar. Both were held in the natural setting of a city garden (see Photo 1).



## Methods

### *Participants*

Study participants were students (mainly studying education, social work, social education, inclusive education, or nursing, but also visiting students originally studying music, music education, or psychology) who attended seminars during their term at the Catholic University of Applied Sciences in Freiburg, Germany. All students were informed about the study purpose and asked whether they wanted to take part during a lesson conducted a week before the study. If they agreed, they were told the location (nearby city garden, see Photo 1) and time of the study. Recruitment was voluntary. The research was conducted according to the ethical and value-oriented principles outlined by the Catholic University of Applied Sciences in Freiburg ([Catholic University of Applied Sciences Freiburg, 2018](#)). Data collection and study intervention sessions were performed in a city garden (see Photo 1). Since there has not been any previous experience related to our specific intervention in a city garden (contrast between silence after DRMT/HMT and silence after seminar) and the specific measurements employed, we did not determine the sample size a priori. However, we considered the enrolment of 80–100 students as part of the running seminars during the semester as sufficient for detecting intervention differences.

### *Study interventions*

The participating students were divided into seven groups. Four of the groups started with the control session and concluded with the experimental session one week later. The other three groups began with the experimental session and had the control session one week later. The experimental condition consisted of a Depth Relaxation Music Therapy (DRMT)/Hypnomusictherapy (HMT) session lasting 16 min held in the natural setting of a city garden (see Photo 1). The control situation consisted of a 16-min seminar held in the same city garden (see Photo 1). Each session was followed by a 6:30-min period of silence. Additional details on the weather conditions and the time specifications (time of day and month in which the sessions were held) are listed in [Table 1](#). Further information describing both sessions in detail can be found in the section ‘Design and analyses’.

**Table 1**  
Details concerning weather conditions, time of day, and months.

	Month session was conducted	Time of the day session began	Temperature (°C)	Wind direction	Wind speed (km/h)	Air pressure (hPa)	Relative humidity (%)
Group 1 (session 1)	June	14:00	21.00	Southwest	16.00	1022.00	64.00
Group 1 (session 2)	June	14:00	24.00	West	9.00	1017.00	50.00
Group 2 (session 1)	June	10:00	21.00	Northwest	5.00	1023.00	68.00
Group 2 (session 2)	June	10:00	20.40	Southwest	7.00	1016.00	69.00
Group 3 (session 1)	June	12:00	25.00	Northwest	7.00	1023.00	61.00
Group 3 (session 2)	June	12:00	23.00	Southwest	13.00	1016.00	59.00
Group 4 (session 1)	June	18:00	29.00	Northwest	11.00	1016.00	54.00
Group 4 (session 2)	June	18:00	22.00	West	12.00	1015.00	73.00
Group 5 (session 1)	July	18:00	20.00	Southwest	12.00	1013.00	72.00
Group 5 (session 2)	July	18:00	30.00	Northwest	4.00	1017.00	64.00
Group 6 (session 1)	May	14:00	26.00	Southwest	11.00	1015.00	30.00
Group 6 (session 2)	June	14:00	23.00	North	8.00	1018.00	47.00
Group 7 (session 1)	July	17:45	31.00	West	9.00	1016.00	30.00
Group 7 (session 2)	July	17:45	22.00	Northwest	10.00	1018.00	52.00

## Measures

### The Daydreaming Frequency Scale (DDFS)

The DDFS consists of 12 items forming a sum score which represents the extent to which an individual in daily life experiences mind-wandering (Stawarczyk, Majerus, van der Linden, & D'Argembeau, 2012). It has been shown to be sensitive to a duration-estimation task in the range of several seconds (Wittmann, Fiedler, Gros, Mossbridge, & Lucci Retz, 2017).

### Multidimensional State Boredom Scale (MSBS)

The MSBS is the only full-scale measure of state boredom (Fahlman, Mercer-Lynn, Flora, & Eastwood, 2013) which has a five-factor structure of Disengagement, High Arousal, Low Arousal, Inattention, and Time Perception. The five subscales are significantly related to a single, second-order factor or main boredom score.

### State Scales on subjective time, self, space (STSS)

The STSS was used to ask the following questions pertaining to the following experiences of silence: (a) the awareness of the bodily self, and (b) the awareness of the surrounding space, with non-verbal pictorial scales containing answer categories ranging from 0 to 6. The questions are: "How intensively did you experience your body?" and "How intensively did you experience the surrounding space?" Higher scores indicate greater awareness of body and space. Two 100-mm-line visual analogue scales (VASs) are presented with the following questions of (c) "How intensively were you aware of time?" (Anchor points: not at all – extremely aware); (d) "How fast did time pass for you?" (Anchor points: Extremely slowly – extremely fast); and (e) Participants were asked to indicate the amount of time they focused on the past, present, and future. A 100-mm line has to be subdivided into three parts (with two vertical marks) representing the past, present, and future. (f) Participants were finally asked to indicate how long they thought that the experience had lasted in units of clock time. The scales have been shown to be sensitive to changes in silence after Depth Relaxation Music Therapy (Pfeifer et al., 2016), for differences in watching two dance-performance speeds (Deinzer, Clancy, & Wittmann, 2017), and for assessing empty waiting time without distraction (Jokic, Zakay, & Wittmann, 2018).

### Level of relaxation

A 100-mm VAS was presented with the following question: "How relaxed do you feel now?" (Anchor points: not at all relaxed – extremely relaxed). This question has proven to be sensitive to assessing the state before and after Depth Relaxation Music Therapy (Pfeifer et al., 2016) and in a real-waiting-time scenario (Jokic et al., 2018).

## Design and analyses

Students either commenced with the experimental session (16-min DRMT/HMT plus 6:30 min of silence) or the control session (16-min seminar on silence in therapy and counselling plus 6:30 min of silence). They then participated in the other condition with one week in between.

As for the experimental part of the study, each HMT was preceded by a brief introduction providing information about the procedure, and the participants were asked to switch off and put away their mobile phones and wrist watches. All of the sessions were guided by a professional music therapist (the first author) utilizing speech to induce depth relaxation by moving, step by step, from building block I to building block V. As mentioned before, Decker-Voigt (2007, 2009) originally described seven buildings blocks in DRMT. Building blocks VI ("Reflection of these experiences and their transference into everyday life through connecting questions") and VII ("Rolling back") were not performed. Steps VI and VII were not relevant for our research focusing on the perception of silence. The therapist invited the participants to make themselves comfortable and to allow themselves to have a pleasant time at the very beginning of each HMT session. Moving on to "building block I", the aim is to foster one's sensitization to the feeling of physical comfort. This was induced by inviting the participants to "sense" their bodies from head to toe. The therapist suggested changing the positions of one's feet, spine, head, etc. to individually create the most comfortable position and ideal sense of physical comfort. For the next step, focusing on breath and breathing ("building block II"), it is very important to mention that Decker-Voigt recommends not to dictate a specific breathing rhythm. Everyone's own individual breathing process – to be understood as a circulating process from inhaling/taking in, to pausing/allowing, to exhaling/giving away, and so on – is accepted and considered therapeutically relevant. Building block III focused on a sensitization to feelings, mental images, and thoughts, all of which the therapist suggested as acceptable. There was no need to try to avoid them or push them away ("Let your thoughts, images, and feelings come and go the way they do."). Building block III was then succeeded by building block IV, "sensitization to the auditory perception of music". For our study, this step implied a sensitization towards the silence as it occurred in the natural setting of the city garden (see Photo 1) while the particular sessions were being conducted. From time to time these silences were interrupted by the sounds of nature (rustling of leaves, wind, etc.). Therefore, it has to be mentioned that we did not rely on "total" or "clinical silences" applied under laboratory conditions, but on natural ones that coincided with the above-mentioned theories that such sounds have a beneficial effect on human health and well-being. The therapist encouraged participants to focus their attention on the acoustic surrounding in step IV. They were invited to listen

to the subsequent silence. Finally, building block V acted as a short phase of reorientation to the “here and now” ending the DRMT session and initiating the final step, where the students filled out the scales. According to the principles of DRMT methodology, the therapist always provided positive connotations relating to the addressed body parts and steps (“All the thoughts circulating in your mind are allowed to do so...”, etc.) throughout the whole process (Decker-Voigt, 2007, 2009).

The control situation consisted of a 16-min seminar also held in the natural setting of the city garden (see Photo 1). Again, the participants were first asked to switch off and put away their wrist watches and mobile phones. In this seminar, the music therapist invited the students to participate in a group discussion focusing on aspects of silence in therapy and counselling. After a brief introduction to the topic, the music therapist moderated the discussion, supported the gathering of information, and summarized the students’ (professional) experiences, ideas, and opinions concerning silence, its various forms, and applications in clinical and non-clinical (health-related) settings. Case examples were collected, and silence’s possible therapy potentials and risks, as well as indications and contraindications, were discussed.

Each of the two conditions (DRMT vs. seminar) was followed by a period of silence lasting 6:30 min, after which the states of consciousness during that period were assessed. After an interval of one week, each group received the alternative intervention, after which the same period of silence (6:30 min) followed and was then assessed. All sessions were led by the same music therapist (the first author).

Concerning the study procedure (see Table 2), each participant in his or her assigned group first received a general introduction to the study aims relating to the question of altered states of time, space, and self. Students subsequently filled out a VAS indicating their level of relaxation and the data-entry forms, consisting of two questionnaires focusing on trait or state (daydreaming, boredom). The propensity to mind-wandering and daydreaming (Wittmann et al., 2017), as well as the feeling of boredom (Zakay, 2014), are related to the perception of the passage of time. Daydreaming is often a way of escaping the negatively felt slow passage of time in boring situations (Wittmann, 2018). Afterwards students either received a seminar consisting of a group discussion that focused on silence in therapy and counselling or took part in a session of Depth Relaxation Music Therapy/Hypnomusicotherapy lasting 16 min each. A period of silence of unknown duration to the students (which lasted 6:30 min) followed. Then, the students filled out scales to indicate how the self, time, and space had been perceived during the silence and how relaxed they had been just afterwards. In a second session one week later, each student in his/her group received the alternative intervention following the same procedure.

Within-subject differences for type of intervention (Depth Relaxation Music Therapy/Hypnomusicotherapy vs. seminar) were assessed using two-sided *t* tests for the measures of state scales of subjective time, self, space (STSS), and the VAS for relaxation. Pearson correlations for associations between the initial boredom state (MSBS) and the Daydreaming Frequency Scale (DDFS), trait variables, and the responses to the two types of intervention were additionally calculated. Initial significance levels were set to  $p < 0.05$ . A multiple comparisons correction procedure, the false discovery rate (FDR) method (Benjamini & Hochberg, 1995), was used to control for multiple statistical tests.

**Table 2**

Outline of the intervention session.

1. General introduction of study aims	5 min
2. Filling out of scale concerning level of relaxation, boredom state (MSBS), and Daydreaming Frequency Scale (DDFS)	10 min
3. Depth Relaxation Music Therapy (DRMT)/seminar focusing on silence in therapy and counselling	16 min
4. Period of silence	6:30 min
5. Filling out of scales concerning state of relaxation and states of consciousness pertaining to the sense of self, time, and space	5 min
(Steps 1–5 were conducted in a city garden)	Total: 42:30 min

**Table 3**

Measures for the states of consciousness for two different conditions in a natural park setting after a period of 6:30 min of silence following a 16-min Depth Relaxation Music Therapy (DRMT)/Hypnomusicotherapy (HMT) session (relaxation) vs. a seminar on silence in therapy and counselling lasting 16 min (seminar).

Measure	Relaxation Mean (S.D.)	Seminar Mean (S.D.)	<i>t</i> = <i>p</i> < ( <i>df</i> = 83)
Intensity sense of self [0 ... 7]	4.0 (1.4)	3.8 (1.3)	−1.1 0.276
Intensity sense of space [0 ... 7]	3.2 (1.8)	3.6 (1.7)	1.4 0.179
Intensity sense of time [0 ... 100]	40.0 (28.7)	35.6 (27.2)	−1.1 0.258
Speed of time passage [0 ... 100]	51.9 (23.7)	66.1 (21.8)	<b>4.9</b> <b>0.001*</b>
% Sense of past [0 ... 100]	21.7 (17.5)	23.8 (19.2)	0.8 0.406
% Sense of present [0 ... 100]	52.5 (24.9)	49.7 (23.6)	−0.9 0.389
% Sense of future [0 ... 100]	25.8 (17.7)	26.5 (19.5)	0.3 0.801
Duration of period of silence [min]	11.7 (7.0)	7.3 (2.9)	−5.6 <b>0.001*</b>
State of relaxation [0 ... 100]	71.6 (21.7)	66.5 (21.5)	−1.7 0.087
State of relaxation [0 ... 100] Difference after-before silence	21.4 (21.1)	19.8 (19.8)	−0.6 0.546

\* Significant after FDR adjustment.

## Results

104 participants took part in our study. Twenty were excluded from our analysis for various reasons (measuring instruments incomplete; showed up only on the first date, but not on the second). We did not analyze the data of follow up on these non-compliers. 84 data sets (74 women, 10 men) aged between 20 and 58 (mean: 24.2; S.D.: 6.0) could finally be used. In comparing the two conditions of silence (after Depth Relaxation Music Therapy/Hypnomusicotherapy and after the seminar) in the natural setting of a city garden (see Photo 1), two variables showed significant differences (Table 3). The silence after the seminar seemed to have passed more quickly (passage of time) than the silence after DRMT/HMT ( $t = 4.9, p < 0.0001$ ). Accordingly, the duration of silence as indicated in clock time (min) was experienced as longer (mean: 11.7 min) after DRMT/HMT than after the seminar (7.3 min) ( $t = -5.6, p < 0.0001$ ).

To assess the impact of the two conditions, silence after DRMT/HMT and after a seminar, the outcome of the relaxation measure was assessed before and after each silence condition. There was significantly ( $t = -9.1, p < 0.001$ ) increased relaxation after (mean: 72.6) DRMT/HMT-induced silence as compared to before (mean: 51.1), as well as after (66.3) vs. before (46.3) the seminar condition ( $t = -9.2, p < 0.001$ ). The difference score for relaxation after vs. before the interval of silence did not differ between the conditions ( $t = -0.6, p < 0.546$ ). We conclude that silence in nature in both conditions led to similar increases in relaxation.

We assessed how relaxation after the two silence conditions correlated with the other subjective scores. We used two relaxation scores (1)

**Table 4a**

Correlation matrix with Pearson's correlation coefficients  $r$  between the state of relaxation and other states after 6:30 min of silence following a 16-min Depth Relaxation Music Therapy/Hypnomusictherapy (DRMT/HMT) session.

Measure DRMT/HRMT session	Relaxation after silence	Relaxation difference score: after vs. before
Intensity sense of self [0 ... 7]	<b>0.282**</b>	<b>0.267*</b>
Intensity sense of space [0 ... 7]	<b>-0.375**</b>	-0.177
Intensity sense of time [0 ... 100]	-0.084	-0.045
Speed of time passage [0 ... 100]	<b>0.337**</b>	0.163
% Sense of past [0 ... 100]	-0.140	-0.082
% Sense of present [0 ... 100]	0.241	0.171
% Sense of future [0 ... 100]	-0.211	-0.174
Duration of period of silence [min]	-0.198	<b>-0.271*</b>

\*  $p < 0.05$ .

\*\* Significant after FDR adjustment.

**Table 4b**

Correlation matrix with Pearson's correlation coefficients  $r$  between the state of relaxation and other states after 6:30 min of silence following a seminar.

Measure Seminar session	Relaxation after silence	Relaxation difference score: after vs. before
Intensity sense of self [0 ... 7]	0.192	0.068
Intensity sense of space [0 ... 7]	0.212	-0.018
Intensity sense of time [0 ... 100]	0.053	-0.066
Speed of time passage [0 ... 100]	0.124	<b>0.283**</b>
% Sense of past [0 ... 100]	-0.211	<b>-0.316**</b>
% Sense of present [0 ... 100]	<b>0.259*</b>	<b>0.387**</b>
% Sense of future [0 ... 100]	-0.095	-0.149
Duration of period of silence [min]	-0.038	0.124

\*  $p < 0.05$ .

\*\* Significant after FDR adjustment.

the relaxation score after the silence, and (2) the difference score after vs. before the silence (Tables 4a and 4b). Following DRMT/HMT, subjects who showed higher scores in relaxation felt themselves more intensely ( $r = 0.282$ ,  $p = 0.009$ ), experienced space to a lesser extent ( $r = -0.375$ ,  $p < 0.001$ ), and felt that time had passed more quickly ( $r = 0.337$ ,  $p = 0.002$ ). Following the seminar, those subjects who felt more relaxed also felt that time had passed more quickly ( $r = 0.283$ ,  $p = 0.009$ ); they had fewer thoughts about the past ( $r = -0.316$ ,  $p = 0.003$ ) and had a stronger focus on the present ( $r = 0.387$ ,  $p < 0.001$ ).

Regarding mind-wandering levels as a trait as assessed with the DDFS, there was no correlation with level of relaxation after silence or the difference score after vs. before silence in either of the two conditions. Correlating the boredom state before the specific inductions (DRMT/HMT, seminar) with relaxation outcomes after the silence sessions revealed several significant associations. Following DRMT/HMT, one scale significantly correlated: those who had had significantly higher scores on the boredom-arousal scale were less relaxed afterwards ( $r = -0.324$ ,  $p = 0.003$ ) (Table 5a). Following the seminar, all subscales of the boredom state scale correlated significantly with the post-relaxation score (Table 5b). Regarding the difference score (post-pre), the more disengaged people were, the less difference in relaxation they felt after vs. before the silence session ( $r = -0.307$ ,  $p = 0.005$ ). In other words, subjects' initial boredom states before a silence after DRMT/HMT hardly had a negative influence. Subjects' initial boredom states before a silence negatively influenced silence in nature after the seminar.

Fig. 1 depicts the two positive correlations between the variable 'relaxation after silence' and 'passage of time' for the two conditions,

**Table 5a**

Correlation matrix with Pearson's correlation coefficients  $r$  between the state of relaxation following a 16-min Depth Relaxation Music Therapy/Hypnomusictherapy (DRMT/HMT) session and initial boredom measured with the Multidimensional State Boredom Scale (MSBS).

Measure DRMT/HRMT session	Relaxation after silence	Relaxation difference score: after vs. before
Disengagement	-0.120	0.040
High Arousal	<b>-0.324**FDR</b>	0.131
Inattention	-0.184	0.115
Low Arousal	-0.131	0.161
Time Perception	0.026	0.009
MSBS total score	-0.182	0.107

\*\* $p < 0.01$ . FDRsignificant after FDR adjustment.

**Table 5b**

Correlation matrix with Pearson's correlation coefficients  $r$  between the state of relaxation following a 16-min seminar and initial boredom measured with the Multidimensional State Boredom Scale (MSBS).

Measure Seminar session	Relaxation after silence	Relaxation difference score: after vs. before
Disengagement	<b>-0.458**FDR</b>	<b>-0.307**FDR</b>
High Arousal	<b>-0.356**FDR</b>	-0.057
Inattention	<b>-0.294**FDR</b>	-0.202
Low Arousal	<b>-0.384**FDR</b>	-0.057
Time Perception	<b>-0.263*FDR</b>	-0.097
MSBS total score	<b>-0.455**FDR</b>	-0.203

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ . FDRsignificant after FDR adjustment.

DRMT/HMT and seminar, respectively. Two aspects can be seen in the scatter plots: (1) the mean of the passage of time after the DRMT/HMT session was on average significantly lower (the passage of time was considered slower with a VAS value of 51.9; see Table 3) as compared to the seminar condition (66.1); (2) the correlation coefficient between the two variables was significant for the DRMT/HMT condition only (see Tables 4a and 4b). After the DRMT/HMT session, the perceived passage of time was on average slower than in the seminar condition, but after the DRMT/HMT session those individuals who were more relaxed experienced a faster passage of time.

## Discussion

Students in the silence condition following Depth Relaxation Music Therapy/Hypnomusictherapy (DRMT/HMT) relatively overestimated the duration of silence and felt that time had passed more slowly as compared to a silence condition of the same duration following the seminar. In relating these findings to previous results, an over-estimation of duration in the milliseconds and seconds range has been measured in psychophysical tasks directly after meditation (Droit-Volet, Fanget, & Dambrun, 2015; Kramer, Weger, & Sharma, 2013). We registered a relative overestimation of duration in the minute range not only following DRMT/HMT indoors (Pfeifer et al., 2016), but also following this intervention in a city garden. This effect can be discussed within the framework of an increased (more mindful) interoceptive awareness after meditation (Wittmann, 2015, 2018). The effect of exposure to the DRMT/HMT session could be described as an increased focus on the bodily self. A stronger awareness of the bodily self is associated with the feeling that time is slowing down or that duration is expanded. Typical situations of increased self-awareness while waiting are often perceived as negative (Jokic et al., 2018). However, with our measure of the sense of self, no difference between the two conditions was observed. A significant, but small, correlation coefficient between level of relaxation and perception of self following DRMT/HMT-related silence is indicative of an overall meditation-induced positive effect of self-related relaxation (such a correlation was not found after the

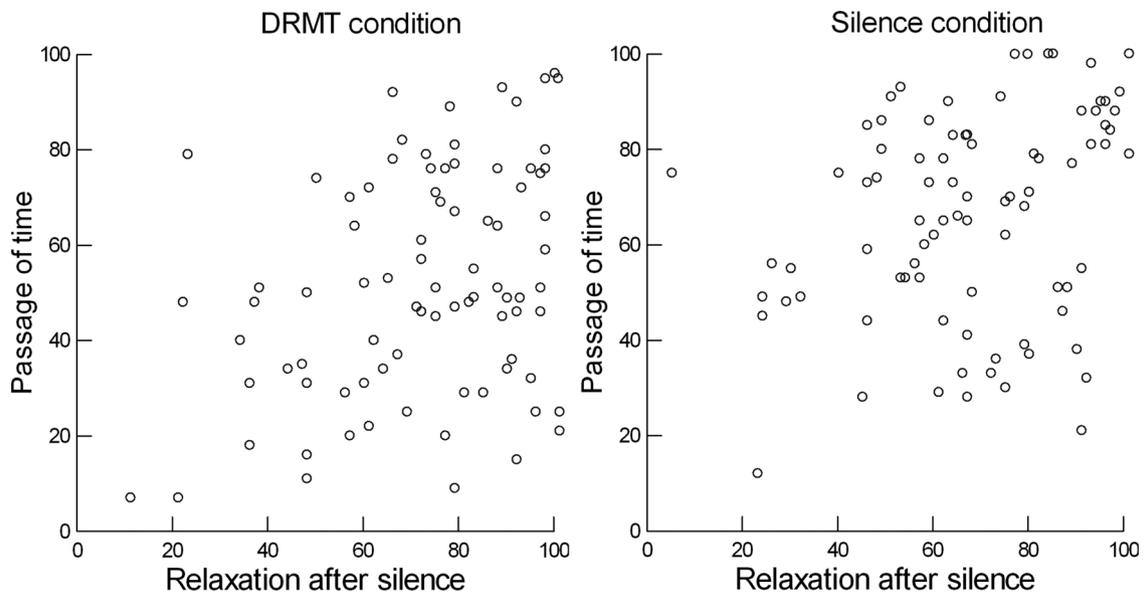


Fig. 1. Scatter plots for the variables 'relaxation after silence' (x axis) and 'passage of time' (y axis) for the two conditions, DRMT/HRMT (left) and seminar, (right).

silence following the seminar). Subjects probably experienced and coped with the empty time interval lasting 6:30 min differently after the DRMT/HMT and the seminar session. For example, subjects in the silence after the seminar showed a positive correlation between being 'present' and being 'relaxed'. Feeling an increased presence is typically a sign of a successful meditation induction. This shows that being exposed to nature itself had some meditative effect without adding any further specific induction technique.

An increased sense of self was related in some individuals to more relaxation (the small correlation coefficient) after the specific DRMT/HMT session. More relaxation was also associated with a faster passage of time. These correlations can be interpreted as indicative of relaxation after DRMT/HMT, which came hand in hand with an increased meditation-induced awareness of the self and a faster passage of time (Table 4a). A faster passage of time is a sign of depth of meditation or the sense of flow among more experienced meditators (Wittmann, 2015, 2018). To sum up these findings, subjects after the DRMT/HMT condition felt that time had passed more slowly. Those who were more relaxed due to the specific body-focused method felt that time had passed more quickly.

One difference relating to the two conditions has to be discussed. Whereas only one subscale of state boredom correlated with relaxation post DRMT/HMT-induced silence (Table 5a), all subscales of the boredom state scale showed the association with relaxation after the seminar (Table 5b). The more bored individuals were before the seminar, the less relaxed they were after the 6:30-min period of silence. This may not be surprising, but it shows that our measures were sensitive to assessing the relationship between seminar-induced boredom and relaxation. Positively formulated, individuals who were not bored before the seminar were more receptive to silence in nature and were able to relax.

What do these findings indicate? Like in the study by Pfeifer et al. (2016), DRMT/HMT combined with silence showed significant effects regarding relaxation. This time, we added nature to this compound, and again, a session of DRMT/HMT followed by silence proved to be effective. Not only that DRMT/HMT may expand music therapy's list of scientifically evaluated tools or techniques, but our study also emphasizes DRMT's/HMT's strengths if applied in a natural setting, which meets current trends to take therapy outdoors (Jordan, 2015). According to our study outcomes, DRMT/HMT enriches a music therapist's palette with a potent technique in the context of health- and relaxation-promotion. Although our study was conducted under non-

clinical conditions, Decker-Voigt (2009) had originally developed DRMT/HMT in a clinical context (social psychiatry, internal medicine, cardiological rehabilitation, care unit for patients with severe brain injuries). Regarding this, further research should be conducted by music therapists focusing on DRMT/HMT combined with silence and nature in clinical settings.

Regarding our design with the evaluation of differences between the two conditions within a natural setting (silence after DRMT/HMT vs. after a seminar, both situated in a city garden), we can only say that a 'natural' silence after DRMT/HMT has the reported effects on subjective time. What we can confirm is that relaxation levels in nature were similarly high for silence after DRMT/HMT and for silence after the seminar. This could be interpreted as a general effect of nature in that both groups in the natural surrounding benefited from the natural silence. In a former indoor study (Pfeifer et al., 2016), silence after DRMT/HMT led to significantly higher levels of relaxation than silence after the seminar. More studies in this direction are definitely necessary. What these two studies indicate is that natural silence itself can have a relaxing effect. DRMT/HMT shows an additional effect on the experience of time

### Limitations

It must be mentioned that both sessions – the DRMT/HMT and the seminar session – were guided by a music therapist. The objection could be raised that the sheer presence of a therapist may have been of therapeutic quality or resulted in an effect even within the control session (seminar on silence in therapy and counselling followed by 6:30 min of silence). In favour of aspects such as comparability between control and experimental condition and reliance on preceding studies (e.g. Pfeifer et al., 2016), we decided to keep this approach. This was especially important because a change in instructor would have meant a further uncontrolled variable. As for variables, it must be mentioned that conducting a study like this in a natural setting, such as a city garden, involves a variety of possibly affecting variables. See, for example, the period of silence. As mentioned above, we worked with the silences that were available at the very moment the sessions were being performed. This meant that there were surrounding and uncontrollable noises affecting the silences. Another factor that could only be controlled for in relative terms was the weather. We conducted the series of sessions between the end of May and the beginning of July and made sure that we always had dry weather. However, some variations are

naturally present when comparing the two within-subject conditions (see Table 1).

### Conclusions and recommendation for further research

In accordance with the above-mentioned theories and study outcomes (Berry et al., 2015; Bratman et al., 2015; Gould van Praag et al., 2017; Ulrich, 1979, 1984), a natural setting proved to be beneficial. Silence, either preceded by a DRMT/HMT or a seminar on silence in therapy and counselling, combined with or held in the natural surroundings of a city garden, showed significant effects in fostering relaxation. Moreover, participants judged silence to elapse more slowly and its duration to have significantly lasted longer after the DRMT/HMT session than after the seminar session. Within the group of people in the DRMT/HMT condition, those who felt more relaxed felt themselves more strongly due to meditation and reported that the passage of time had passed more quickly as well. Participants dealt with silence differently, depending on whether it followed DRMT/HMT or the seminar. This led to the differences in the perceived passage of time and the duration judgements. Within the group experiencing silence after DRMT/HMT, those who were more relaxed also felt a faster passage of time. The experience of a faster passage of time is generally pronounced when fully immersed in activities accompanied with positive feelings, like in states of “flow” in sports, work, or play (Csikszentmihalyi & Csikszentmihalyi, 1988). Experienced meditators also report a faster passage of time as a sign of immersion in meditative states (Wittmann, 2015, 2018). Future research could use this variable as a measure of experience during various music-induction techniques.

In times of increasing distress and stress-related symptoms (poor sleep, poor concentration, listlessness, etc.) with a growing demand for counselling due to mental or social problems (AOK, 2017; Heilmann, Brähler, Hinz, Schmutzer, & Gumz, 2015) among students, supportive and cost-effective models ought to be developed. Gouda, Luong, Schmidt, and Bauer (2016), for example, showed that mindfulness-based interventions seem to work in this field for both students and teachers. Regarding our study, the combination of Depth Relaxation Music Therapy/Hypnomusichotherapy, silence, and nature probably offers such a beneficial treatment model. But, of course, application should not be restricted to student participants. A wider range of potential fields and beneficiaries have to be explored for fostering relaxation.

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### Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.aip.2019.02.006>.

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